CLAIMS

1. A medical system comprising:

- a medical instrument to be guided in a patient body,

- X-Ray acquisition means for acquiring a two-dimensional X-ray image comprising a projection of said medical instrument in accordance with a geometry of said X-Ray acquisition means,

- ultrasound acquisition means for acquiring a three-dimensional ultrasound data set of said medical instrument using an ultrasound probe,

-, means for localizing said ultrasound probe within a referential of the X-ray acquisition means,

- means for providing a first ultrasound localization of said medical instrument within a referential of said ultrasound acquisition means,

- means for converting said first ultrasound localization within said referential of the ultrasound acquisition means into a first X-ray localization within said referential of the X-ray acquisition means, using said localization of the ultrasound probe,

- means for providing a second X-ray localization of said projection of the medical instrument in a referential of said two-dimensional X-ray image,

- means for mapping said three-dimensional ultrasound data set with said two-dimensional X-ray image in accordance with a transformation, which minimizes a distance between a projection of said first X-ray localization on said two-dimensional X-Ray image in accordance with said geometry of the X-Ray acquisition means and said second X-ray localization,

- means for generating and displaying a bi-modal representation of said medical instrument in which said two-dimensional X-ray image and said mapped three-dimensional ultrasound data set are combined.

2. A system as claimed in claim 1, wherein said means for providing a first ultrasound localization and said means for providing a second X-Ray localization of said medical instrument comprise detection means for detecting localization features of said medical instrument.

3. A system as claimed in claim 2, wherein said localization features comprise a landmark of said medical instrument.

4. A system as claimed in claim 3, wherein said transformation comprises a translation.

5. A system as claimed in claim 2, wherein said localization features comprise a plurality of landmarks of said medical instrument.

6. A system as claimed in claim 5, wherein said transformation comprises a translation and three rotations.

7. A system as claimed in claim 1, wherein said transformation is intended to minimize a three-dimensional displacement of said first X-Ray localization.

8. A system as claimed in claim 5, wherein said plurality of landmarks belongs to said medical instrument and to at least a first and a second reference medical instruments.

9. A system as claimed in claim 1, wherein said ultrasound probe localization allows to define a crop plane, which delimitates in the 3D ultrasound data set data to be removed from data to be used by the generating and display means for generating said bimodal representation.

10. A method of guiding a medical instrument in a patient body, comprising the steps of:
   - acquiring a two-dimensional X-ray image using an X-ray acquisition system, said two-dimensional X-ray image comprising a projection of said medical instrument in accordance with a geometry of said X-ray acquisition system,
   - acquiring a three-dimensional ultrasound data set of said medical instrument using said ultrasound probe,
   - localizing said ultrasound probe in a referential of said X-ray acquisition system,
   - providing a first localization of said medical instrument within a referential of said 3D ultrasound data set,
   - converting said first localization within said referential of the 3D ultrasound data set into a first X-Ray localization within said referential of the X-ray acquisition system,
   - providing a second localization of said projection of the medical instrument in a referential of the two-dimensional X-Ray image,
   - mapping said three-dimensional ultrasound data set with said two-dimensional X-ray image in accordance with a transformation, which minimizes a distance between a

projection of said first X-Ray localization on said two-dimensional X-Ray image in accordance with said geometry of the X-Ray acquisition means and said second localization,

-   generating and displaying a bimodal representation of said medical instrument in which both 2D X-ray image and said mapped 3D ultrasound data are combined.

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